ABSTRACT

MEM devices are fabricated with integral dust covers, cover support posts and particle filters for reduced problems relating to particle contamination. In one embodiment, a MEM device (10) includes an electrostatic actuator (12) that drives a movable frame (14), a displacement multiplier (16) for multiplying or amplifying the displacement of the movable frame (14), and a displacement output element (18) for outputting the amplified displacement. The actuator (12) is substantially encased within a housing formed by a cover (36) and related support components disposed between the cover (36) and the substrate (38). Electrically isolated support posts may be provided in connection with actuator electrodes to prevent contact between the cover and the underlying electrodes. Such a support post may also incorporate an electric filter element for filtering undesired components from a drive signal. Particle filters may be provided in connection with etch release holes or other openings in order to further protect against particle contamination.